



Blood Microbiome: an Affinity Research Collaboration

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ARC theme: Microbiome and Systemic Inflammation

Human Microbiome Project: NIH

Do humans share a core human microbiome?

Can changes in the microbiome correlate with changes in human health?

What is the technology required to answer these questions?



http://nihroadmap.nih.gov/hmp/

Blood Microbiome



Blood Microbiome: Creating the Model

Hypothesis:

Patients with chronic inflammatory disease will have diseasespecific <u>Blood Microbiomes</u> evidenced by different predominant bacterial species, frequency or persistence of bacteremia, and specific effects on systemic immunity compared to healthy subjects.



Mouth

Blood

Healthy vs Disease (FOCUS 1: T2DM & periodontal disease) Current perspectives in Chronic Inflammatory Diseases: circulating LPS or "endotoxemia"



Surrogate markers may not be informative

Anti-inflammatory LPS?



-Inflammatory LPS?

- Fatty acylation and chain length determine immunological response
- Are there other relevant receptors?
- Model: Human and animal LPS responses are different

Berezow, A 2009

Detection: High throughput, direct and sensitive

MIM Human Microbe Identification Microarray

http://mim.forsyth.org/homim.html

Ibis Biosciences

http://www.ibisbiosciences.com/index.html http://www.abbott.com/global/url/home/en_US

Blood Microbiome ARC: Defining the Model

Figure 3: Proposed Model for characterizing the Blood Microbiome



Blood Microbiome: funding prospects

Pathophysiology

- Contribute to current knowledge of the "trigger(s)" for the persistent inflammatory response in highly prevalent chronic diseases: Type 2 diabetes, Obesity, IBD, Periodontal disease
- Inform disease therapy (e.g. antibiotic/probiotic, receptor-based therapies)

Translational applications:

Bacterial signatures that predict flares in IBD or cardiovascular risk in obesity

Disease Prevention:

 Modification of gut/oral microbiome to target a "healthy" blood microbiome in high-risk populations

Blood Microbiome ARC

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Blood Microbiome:

Dynamic



30 minutes post-tooth cleaning